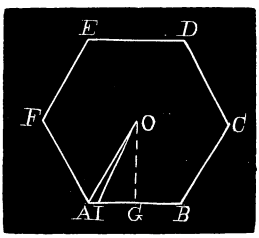
And 3% of .97=.02 $\frac{91}{100}$.
97% + $2\frac{91}{100}$% = $99\frac{91}{100}$% = cost on repurchasing.
Loss is 100% − $(97-2\frac{91}{100})$% = $5\frac{91}{100}$%.
∴ $5\frac{91}{100}$% = \$12.00.
Then 1% = \$2.0305.
And 100% = \$203.05.

4. I. What is the number of acres in a field in the form of a regular hexagon, if it contains as many acres as there are boards in the fence inclosing it, the boards being $l=8\sqrt[4]{3}$ feet long and the fence $n=6$ boards high?

Solution by B. F. FINKEL, Professor of Mathematics in Kidder Institute, Kidder, Missouri.

Construction.— Let $ABCDEF$ be the field, O the center, AI the length of a panel of the fence. Connect A and I with the center of the field by the lines AO and IO. Draw OG perpendicular to the side AB. Then

II.
1. $AI=8\sqrt[4]{3}$ feet, and
2. *area* of $AOI=6A=261360$ sq.ft., since there are as many acres in the field as there are boards in the fence inclosing it and the panel being 6 boards high.
3. $\frac{1}{2}(AI\times OG)$ = the area of the triangle $AOI=\frac{1}{2}(8\sqrt[4]{3}\times OG)=4\sqrt[4]{3}\times OG$.
4. $\therefore 4\sqrt[4]{3}\times OG=261360$, the number of square feet in the triangle AOI, whence
5. $OG=261360\div 4\sqrt[4]{3}=\frac{65340}{4\sqrt[4]{3}}$. But
6. $OG=\sqrt{[AO^2(=AB^2)-AG^2(=\frac{1}{2}AB)^2]}=\frac{1}{2}AB\sqrt{3}$.
7. $\therefore \frac{1}{2}AB\sqrt{3}=\frac{65340}{4\sqrt[4]{3}}$, whence
8. $AB=\frac{130680}{\sqrt[4]{3^3}}$ ft., the length of a side of the field. Then
9. $\frac{130680}{\sqrt[4]{3^3}}\div 8\sqrt[4]{3}=5445$, the number of panels on a side, and
10. $6\,(6\times 5445)=196020$, the number of acres in the field.



III. ∴ There are 196020 acres in the field.

Remark.— If we let l = the length of a rail and n, the number of rails in a panel, the number of acres in a hexagonal field will be $174240n^2\div l^2\sqrt{3}$. From the nature of the problem, n must be integral. ∴ The number of acres and the length of the rails can not both be rational. The above solution is also applicable when the field is in the form of a square.

PROBLEMS.

5. **Proposed by E. E. KINNEY, Anaconda, Montana.**

A board is 16 in. long and 9 in wide. How may it be cut in two parts that the parts joined together may form a square?